REMARKS

As an initial matter, Applicant gratefully acknowledges the examiner's indication in the Office Action that various of the pending claims are patentable over the cited prior art and would be allowable. In addition, the Examiner's effort in attending a telephone call regarding the Office Action on May 2, 2006 is acknowledged. During that call, the undersigned and Examiner discussed the cited prior art cited in the Office Action but no agreement was reached.

This application has been amended to be in a condition for allowance. Reconsideration and allowance of the amended application are respectfully requested.

Status of Claims

Claim 13, 16 and 51 have been amended to correct typographical errors. New dependent Claims 54-73 have been added based on the specification as originally filed. No new matter is added.

Claims 1-10, 13, 16, 18, 19, 21-29, 41-43, and 50-73 are now pending and are patentable.

Claims 13, 28 and 51 Patentable under 35 USC 112

Claims 13, 28 and 51 stand rejected under 35 USC §112, first and second paragraphs, for reciting the plane strain fracture toughness of greater than 40 MPa$(m)^{1/2}$. The Office Action contends that this feature is not described in the specification of this application as originally filed. This contention, however, is respectfully traversed because page 21, lines 9-11 of the original specification specifically describes this feature. Hence, the rejection under 35 USC §112, first and

second paragraphs, should be withdrawn. Accordingly, Claims 13, 28 and 51 are patentable.

Claim 50 Patentable over Giolitti

Claim 50 stands rejected under 35 USC §102(b) over Giolitti. This contention is respectfully traversed because the Office Action fails to show that Giolitti teaches each feature in Claim 50.

Claim 50 recites a method of making a composite laminate material by reaction between two different metals. In contrast, Giolitti discloses a de-carbonization method of a steel of different steel layers with different concentration levels of carbon. Giolitti does not disclose a process that cause two different metals to react with each other. Hence, Giolitti is very different from Claim 50 and does not teach each feature in Claim 50.

As a specific example, Claim 50 recites interleaving (1) a plurality of first foils made from one or more of first metals and metal alloys, with (2) a plurality of second foils made from one or more of second metals and metal alloys suitable to react with the one or more of the first metal and metal alloys to produce a hard intermetallic compound. Giolitti fails to disclose this feature and instead describes a plate structure of different steel zones a, b and c with different concentration levels of carbon illustrated in the drawing. Nothing in Giolitti suggests the second foils made from one or more of second metals and metal alloys are suitable to react with the one or more of the first metal and metal alloys to produce a hard intermetallic compound as recited in Claim 50.

Claim 50 also recites reacting in situ under heat and pressure in the presence of atmospheric gases the plurality of first foils with the plurality of second foils so as to substantially completely react the one or more of the second metals and metal alloys with the one or more of the first metal and metal alloys to form where each second metal foil had been a region of a hard inter-metallic compound. In contrast, Giolitti's process as cited in the Office Action places a piece of steel in contact with a mixture of silicious sand and ferric oxide and then heats the steel piece up to 1000 degrees C for 90 hours. Next, the steel is placed in contact with a charcoal and barium carbonate and is heated up to 1100 degrees C for 20 hours. Finally, the steel is placed in contact with the same mixture of silicious sand and ferric oxide in the first step (page 2, lines 95-109). Based on the disclosure in Giolitti, Giolitti fails to disclose the reacting process which substantially completely reacts the one or more of the second metals and metal alloys with the one or more of the first metal and metal alloys to form where each second metal foil had been a region of a hard inter-metallic compound. Indeed, as the Office Action correctly suggests, Giolitti does mention that the steel is heated up to 1000 degrees C for 90 hours. However, contrary to what is stated in the Office Action, this heating in Giolitti is conducted by placing the steel in contact with a mixture of silicious sand and ferric oxide in order to carbonize the steel piece. Nothing in Giolitti is related to the processing in Claim 50.

Giolitti also mentions "ordinary mechanical manipulations" including pressing, rolling, hammering and the like in shaping a steel piece at page 1, lines 50-57. However, this process of

Giolitti is conducted after the carbonization of the steel piece is performed. The Office Action appears to improperly mingle this process with the heating treatment during the carbonization process in Giolitti.

For at least the above reasons, the Office Action fails to make a prima facie showing that Giolitti anticipates Claim 50 and, based on the above analysis, Claim 50 is distinctly different from the process described in Giolitti. Therefore, Claim 50 is patentable.

Claims 1 et al. Patentable over Rosenthal

Claims 1-2, 5, 6, 8-10, 16, 18, 19, 23-26 and 41-43 stand rejected under 35 USC §102(b) over Rosenthal. This contention is respectfully traversed because the Office Action fails to show that Rosenthal teaches each feature in these claims.

Claim 1, for example, recites reacting in situ under heat and pressure in the presence of atmospheric gases the plurality of first foils with the plurality of second foils so as to substantially completely react the one or more of the second metals and metal alloys with the one or more of the first metal and metal alloys, forming where each second metal foil had been a region of a hard inter-metallic compound. In contrast, Rosenthal discloses forming a fiber-containing reinforced bonding layer 14 to bond the titanium layers 11 and thus does not disclose aspect of Claim 1.

More specifically, Rosenthal describes the following with respect to the reinforced bonding layer 14 in Col. 5, lines 20-41:

> *Composites 10 and 17 are formed by superposing outer layers of a titanium alloy foil 11 and central layers of a eutectic-forming metal layer*

> *13 and a thin reinforcing fabric layer 12 as shown in prebonded condition in FIGS. 1A and 2A, and metallurgically bonding the layers together to form titanium layers 11 and the reinforced bonding layer 14 in the composite structures. The two alloy matrices 10 and 17 that are formed are referred to as integral matrices or composites because a primary feature of the present invention involves the concept of integrating the contacting surfaces of the different layers 11 and 13 at 15 and 16 while melt-infiltrating the thin reinforcing fibers or fabric 12 into layer 14 at temperatures not harmful thereto, to form unitary composites which are free of the normal intra-surface defects and weaknesses produced in the absence of the lower melting, eutectic-forming bonding layer 13. In this manner composites can be prepared which are multidirectionally-and continuously-reinforced and which have high strength and stiffness at temperatures up to about 1,200.degree. F. can be shaped due to the flexibility of the thin reinforcing filaments and fabrics.*

Therefore, the Rosenthal's process melts the eutectic-forming metal 13 to melt-infiltrate the thin reinforcing fibers or fabric 12 into the layer 14. Rosenthal further provides that

> *The critical eutectic-forming metal bonding layer 13, useful according to the present invention, comprises a thin layer of a metal which is capable of forming a liquid eutectic mixture or alloy with the major metal of the metallic layer, such as titanium, when heated to a temperature between about 1,650.degree. F. and 1,800.degree. F. in pressure association with the intermetallic layer, such as layers 11 and 21 of the drawings. The preferred metal is copper but other metals such as nickel and cobalt and copper alloys containing major percentages of copper can also be used provided that the metal layer forms a liquid eutectic alloy with the titanium layer at a temperature within the range of from about 1,650.degree. F. to about 1,810.degree. F. This allows the melted eutectic alloy to infiltrate or envelop the*

reinforcing fiber or fabric under the temperatures and pressures used in the HIP process and metallurgically bond to the intermetallic layers such as the titanium alloy layers with which it forms a eutectic alloy interface.

Col. 7, lines 48-66. Hence, Rosenthal discloses metallurgical bonding via a eutectic alloy interface between a titanium layer 11 and the reinforced bonding layer 14.

Contrary to the contention made in the Office Action, Rosenthal does not disclose or suggest reacting in situ under heat and pressure in the presence of atmospheric gases the plurality of first foils with the plurality of second foils so as to substantially completely react the one or more of the second metals and metal alloys with the one or more of the first metal and metal alloys, forming where each second metal foil had been a region of a hard inter-metallic compound. Notably, Rosenthal shows in various figures, such as FIGS. 1B-8B that each reinforced bonding layer 14 made from the eutectic-forming metal layer 13 and the thin reinforcing fabric layer 12 remains in the final material and certainly does not substantially completely react with another material to form a region of a hard inter-metallic compound.

For the above reasons, Claim 1 is distinctly different from and this is patentable over Rosenthal.

Accordingly, Claims 2, 5, 6, 8-10, 16, 18, 19, 23-26 and 41-43 are patentable under 35 USC §102(b) over Rosenthal for the above reasons and based on their own merits.

Claim 4 stands rejected under 35 USC §103(a) as being obvious over Rosenthal. This rejection has been obviated based on the above arguments made for Claim 1.

In addition, new dependent Claims 54-73 have been added. These claims are fully supported by the specification as originally filed and thus no new matter is added. In addition, these claims are patentable over the cited prior art on record.

In summary, each of the objections and rejections raised in the Office Action has been overcome or obviated. All pending claims are therefore in a full condition for allowance. There are no other outstanding issues in the application as amended above. Hence, Applicant respectfully requests for issuance of an official notice of allowance.

Please apply a fee of $225 for extension of time for two months and a fee of $300 for excess claim fees, and any other charges or credits to Deposit Account No. 06 1050.

Respectfully submitted,

Date: July 18, 2006

Bing Ai
Reg. No. 43,312

Fish & Richardson P.C.
PTO Customer No. 20985
12390 El Camino Real
San Diego, California 92130
Telephone: (858) 678-5070
Facsimile: (858) 678-5099
10649074.doc